**Data Evaluation Record on the biotransformation of chlormequat chloride in soil under runoff and leaching conditions**

PMRA Submission Number {.....} EPA Accession Number 124060

| | | |
|---|---|---|
| Data Requirement: | PMRA Data Code: | |
| | EPA DP Barcode: | D334541 |
| | OECD Data Point: | |
| | EPA Guideline: | Nonguideline |

**Test material:**

| | |
|---|---|
| Common name: | Chlormequat chloride. |
| Chemical name: | |
| IUPAC name: | 2-Chloroethyltrimethylammonium chloride. |
| CAS name: | 2-Chloro-N,N,N-trimethylethanaminium chloride. |
| CAS No.: | 999-81-5 |
| Synonyms: | CYCOCEL. |
| Smiles string: | ClCCN(Cl)(C)(C)C (EPI Suite, v3.12). |

**Primary Reviewer:** Lynne Binari **Signature:**
**Cambridge Environmental** **Date:** 12/7/06

**Secondary Reviewer:** Kathleen Ferguson **Signature:**
**Cambridge Environmental** **Date:** 12/7/06

**QC/QA Manager:** Joan Gaidos **Signature:**
**Cambridge Environmental** **Date:** 12/7/06

**Final Reviewer:** Marietta Echeverria **Signature:** Marietta Echeverria
**EPA Reviewer** **Date:** 1/9/07

**Company Code:**
**Active Code:**
**Use Site Category:**
**EPA PC Code:** 018101.

**CITATION:** Dupre, G. 1975. Runoff characteristics of $^{14}$C-cycocel$^{(R)}$ applied to clay loam soil under greenhouse conditions. Unpublished study performed by Bio/dynamics Inc., East Millstone, New Jersey (p. 1, google); sponsored by American Cyanamid Company, Wayne, New Jersey (p. 3, google); and submitted by Task Force of Chlormequat-chloride Data c/o Agrolinz Agrarchemikalien GmbH, Linz, Austria (MRID 46715225). Bio/dynamics Report No.: 75020 (p. 1). Experimental start and termination dates not reported. Final report issued September 8, 1975.

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PMRA Submission Number {.....} EPA MRID Number 129060

| | | |
|---|---|---|
| Data Requirement: | PMRA Data Code: | |
| | EPA DP Barcode: | D333237 |
| | OECD Data Point: | |
| | EPA Guideline: | Nonguideline |

**Test material:**

| | |
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| Common name: | Chlormequat chloride. |
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## EXECUTIVE SUMMARY

Runoff and leaching of [ethyl 1- or 2-$^{14}$C]-labeled 2-chloroethyltrimethyl ammonium chloride (chlormequat-chloride, Cycocel) was studied in clay soil (22% sand, 33% silt, 45% clay, 3.2% organic matter, 1.9% organic carbon, pH 6.6, 30.4% soil moisture at 1/3 bar; pp. 3-4; Table I, p. 9) from Hawaii for 7 days under greenhouse conditions. This study was conducted to support registration of chlormequat-chloride by providing supplemental information and was neither designed nor intended to fulfill any guideline requirements. No statement was provided indicating whether or not the study was conducted in compliance with any GLP regulations. The test system consisted of a rectangular, sheet metal tray (12-inch width, 36-inch length, 3-inch depth, 1-inch lip along front side, 3-inch fluted lip along remaining three sides, *ca.* 8° inclination) maintained in a greenhouse (pp. 3-4; Figure 1, p. 23). A removable covered tray was mounted under the front 1-inch lip to collect runoff, while a tube connected to the base of the tray was used to collect leachate (p. 4). One day prior to treatment, clay soil was placed in the tray to a depth of 3 inches, lightly tamped and watered until saturated (p. 5). An aqueous solution of [$^{14}$C]chlormequat-chloride (purity not reported; specific activity 5,507 dpm/µg, 2.53 µCi/mg; p. 3; Table II, p. 10) was applied at 1.7 mg a.i./kg (12.9 mg, 73,400,000 dpm in 100 mL water, 1.3 lb a.i./A) via a spray mist dispenser bottle to a 12-inch x 12-inch area at the upper inclined end of the 12-inch x 36-inch soil surface (p. 5; Table II, p. 10; Table V, p. 13; Appendix B, p. 21). Following application, water (100 mL) was added to the sprayer and applied to the treated soil surface area to ensure complete transfer of [$^{14}$C]chlormequat-chloride test solution (p. 5). At 1, 3 and 7 days posttreatment, *ca.* 1 acre-inch of artificial rainfall was applied at 1-2 acre-inches/hour via greenhouse spray heads to the entire soil surface area (pp. 1, 4-6). At day 0 posttreatment, five soil cores (depth, diameter not reported; Reviewer's Comments), were taken from the 12-inch x 12-inch treated area (p. 7; Figure 2, p. 24). Runoff and leachate water were collected at 1, 3 and 7 days posttreatment after application of the simulated rainfall (Appendix A, pp. 16-18). At 7 days posttreatment soil cores were collected from the 12-inch x 12-inch treated area and from the untreated area which had been divided into 3-inch segments along the remaining 24-inch length of the soil bed (p. 7; Appendix A, pp. 19-20; Figure 3, p. 25). Triplicate aliquots of the water (5 mL) and soil (*ca.* 5 g) samples were analyzed for total radioactivity by LSC (Appendix A, pp. 16-20).

A total of *ca.* 3.4 inches of artificial rainfall was applied to the soil plot over the 7-day study interval; no additional climatic conditions were reported (p. 7; Table III, p. 11). At 7 days posttreatment, overall recovery of radiolabeled material totaled 103.4% of the applied with 94.2%, 9.2% and <0.02% of the applied recovered in the soil, runoff water and leachate water, respectively (Tables IV-VI, pp. 12-14). The majority, 84.4% of the applied total [$^{14}$C]residues remained in the treated 12-inch x 12-inch area, with minor amounts (9.8% of applied total) translocating throughout the 24-inch untreated soil bed and/or recovered in runoff water.

Table 1: Translocation of [$^{14}$C]residues, expressed as percentage of applied radioactivity, in runoff water and soil following treatment of Hawaiian clay soil (12-inch wide, 36-inch length, 3-inch depth, 8° inclination) with [$^{14}$C]chlormequat-chloride and application of artificial rainfall.[1]

| Matrix | | Sampling times (days posttreatment) | | |
|---|---|---|---|---|
| | | 1 | 3 | 7 |
| Soil | 0- to 12-inch treated area | --[2] | -- | 84.4 |
| | 12-15 inches (untreated) | -- | -- | 1.9 |
| | 15-18 inches (untreated) | -- | -- | 1.5 |
| | 18-21 inches (untreated) | -- | -- | 2.1 |
| | 21-24 inches (untreated) | -- | -- | 0.8 |
| | 24-27 inches (untreated) | -- | -- | 0.9 |
| | 27-30 inches (untreated) | -- | -- | 0.7 |
| | 30-33 inches (untreated) | -- | -- | 0.7 |
| | 33-36 inches (untreated) | -- | -- | 0.7 |
| | Recovered in runoff water | 0.34 | 0.46 | 0.5 |
| | Total recovered in soil | -- | -- | 94.2 |
| Runoff water | | 4.9 | 7.0 | 9.2 |
| Leachate water | | <0.02 | <0.02 | <0.02 |
| Total recovery | | -- | -- | 103.4 |

[1]Approximately 1 inch of artificial rainfall applied at 1, 3 and 7 days posttreatment.
[2]Either result not available or could not be determined.
Data obtained from Appendix A, pp. 16-20; summations performed by primary reviewer via Texas Instruments TI-60 scientific calculator.

## REVIEWER'S COMMENTS

1. The study report appears to be incomplete and missing up to three pages of the 28-page report, even though the pages are numbered consecutively in two locations on each page. For example, the last sentence of section 2.5 Experimental Design on page "5" is not coherent with the continuing first sentence on page "6". Consequently, information regarding sampling of the soil following treatment was not provided in the study report. Additionally, Appendix A - Table I is appears to be missing. However, the absent information does not appear to significantly impact any conclusions drawn from the study results.

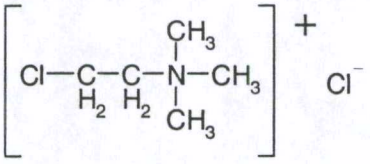
2. The study author characterized the test soil as a clay loam; however, according to the USDA Textural Triangle, the test soil was a clay (22% sand, 33% silt, 45% clay; Table 1, p. 9).

## Attachment 1: Structures of Parent Compound and Transformation Products

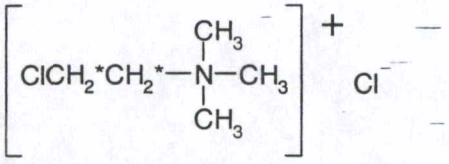
**Chlormequat chloride [Cycocel]**

**IUPAC Name:** 2-Chloroethyltrimethylammonium chloride.
**CAS Name:** 2-Chloro-N,N,N-trimethylethanaminium chloride.
**CAS Number:** 999-81-5.
**SMILES String:** ClCCN(Cl)(C)(C)C (EPI Suite, v3.12).

**Unlabeled**



**[$^{14}$C]chlormequat chloride**



* = Position of radiolabel.

**Identified Compounds**

**Chlormequat chloride [Cycocel]**

**IUPAC Name:** 2-Chloroethyltrimethylammonium chloride.
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